# Alpha-Linolenic Acid (ALA)


- Overview
- Uses
- Dietary Sources
- Available Forms
- How to Take It
- Precautions
- Possible Interactions
- Supporting Research


## Overview

Alpha-linolenic acid, or ALA, is an essential fatty acid, which means that it is essential to human health but cannot be manufactured by the body. For this reason, ALA must be obtained from food. ALA, as well as the fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), belongs to a group of fatty acids called omega-3 fatty acids. EPA and DHA are found primarily in fish while ALA is highly concentrated in certain plant oils such as flaxseed oil and to a lesser extent, canola, soy, perilla, and walnut oils. ALA is also found in wild plants such as purslane. Once ingested, the body converts ALA to EPA and DHA, the two types of omega-3 fatty acids more readily used by the body.

It is important to maintain an appropriate balance of omega-3 and omega-6 (another essential fatty acid) in the diet as these two substances work together to promote health. These essential fats are both examples of polyunsaturated fatty acids, or PUFAs. Omega-3 fatty acids help reduce inflammation and most omega-6 fatty acids tend to promote inflammation. An inappropriate balance of these essential fatty acids contributes to the development of disease while a proper balance helps maintain and even improve health. A healthy diet should consist of roughly two to four times more omega-6 fatty acids than omega-3 fatty acids. The typical American diet tends to contain 11 to 30 times more omega-6 fatty acids than omega-3 fatty acids and many researchers believe this imbalance is a significant factor in the rising rate of inflammatory disorders in the United States.

Omega-3 fatty acids have been shown to reduce inflammation and help prevent certain chronic diseases such as heart disease and arthritis. These essential fatty acids are highly concentrated in the brain and appear to be particularly important for cognitive and behavioral function as well as normal growth and development.

# Gamma-Linolenic Acid (GLA)


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## Overview

Gamma-linolenic acid (GLA) is an essential fatty acid (EFA) in the omega-6 family that is found primarily in plant-based oils. EFAs are essential to human health but cannot be made in the body. For this reason, they must be obtained from food. EFAs are needed for normal brain function, growth and development, bone health, stimulation of skin and hair growth, regulation of metabolism, and maintenance of reproductive processes.

Linoleic acid (LA), another omega-6 fatty acid, is found in cooking oils and processed foods and converted to GLA in the body. GLA is then broken down to arachidonic acid (AA) and/or another substance called dihomogamma-liolenic acid (DGLA). AA can also be consumed directly from meat, and GLA is available directly from evening primrose oil (EPO), black currant seed oil, and borage oil. Most of these oils also contain some linoleic acid.

The average North American diet provides more than 10 times the necessary amount of linoleic acid and tends to have too much omega-6 fatty acids compared to omega-3 fatty acids, another important class of EFAs. In fact, for optimum health, the ratio of omega-6 to omega-3 fatty acids should be between 1:1 and 4:1. The typical North American and Israeli diets are usually in the range of 11:1 to 30:1. This imbalance contributes to the development of long-term diseases such as heart disease, cancer, asthma, arthritis, and depression as well as, possibly, increased risk of infection.

Interestingly, not all omega-6 fatty acids behave the same. Linoleic acid (not to be confused with alpha-linolenic acid, which is in the omega-3 family) and arachidonic acid (AA) tend to be unhealthy because they promote inflammation, thereby increasing the risk of the diseases mentioned when consumed in excess. In contrast, GLA may actually reduce inflammation.

Much of the GLA taken from the oils mentioned or as a supplement is not converted to AA, but rather to DGLA. DGLA competes with AA and prevents the negative inflammatory effects that AA would otherwise cause in the body. Having adequate amounts of certain nutrients in the body (including magnesium, zinc, and vitamins C, B3, and B6) helps to promote the conversion of GLA to DGLA rather than AA.

It is important to know that many experts feel that the science supporting the use of omega-3 fatty acids to reduce inflammation and prevent diseases is much stronger than the information regarding use of GLA for these purposes. Two important, and most studied, omega-3 fatty acids include eicosopentaenoic acid (EPA) and docosahexaenoic aci□ (DHA), both found in fish and fish oils.

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FILE 'HOME' ENTERED AT 10:19:37 ON 24 SEP 2002

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COST IN U.S. DOLLARS

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http://www.cas.org/ONLINE/STN/STNOTES/stnotes27.pdf

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             1 GAMMAS
        112206 GAMMA
                    (GAMMA OR GAMMAS)
           122 LINOLENIC
       5577000 ACID
          7846 ACIDS
       5582710 ACID
                    (ACID OR ACIDS)
L1          14 GAMMA LINOLENIC ACID
                    (GAMMA(W)LINOLENIC(W)ACID)

=> s alpha linolenic acid
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       2448315 ALPHA
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           122 LINOLENIC
       5577000 ACID
          7846 ACIDS
       5582710 ACID
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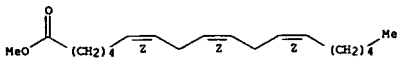
(ACID OR ACIDS)
L2 5 ALPHA LINOLENIC ACID
(ALPHA(W)LINOLENIC(W)ACID)

=> d scan l1

L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, methyl ester, (6Z,9Z,12Z)- (9CI)
MF C19 H32 O2

Double bond geometry as shown.



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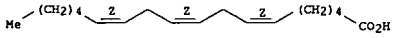
HOW MANY MORE ANSWERS DO YOU WISH TO SCAN? (1):13

L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, zinc salt, (Z,Z,Z)- (9CI)
MF C18 H30 O2 . 1/2 Zn

Double bond geometry as shown.

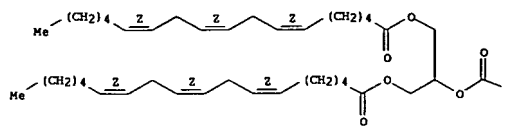


●1/2 Zn

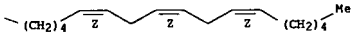
L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, 1,2,3-propanetriyl ester, (6Z,6'Z,6''Z,9Z,9'Z,9''Z,12Z,12'Z,12''Z)- (9CI)
MF C57 H92 O6

Double bond geometry as shown.

PAGE 1-A



PAGE 1-B



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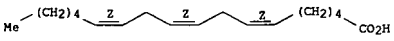
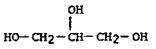
L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, monoester with 1,2,3-propanetriol, (Z,Z,Z)- (9CI)
MF C21 H36 O4
CI IDS

CM 1

Double bond geometry as shown.

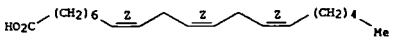


CM 2



L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 8,11,14-Eicosatrienoic acid, (8Z,11Z,14Z)- (9CI)
MF C20 H34 O2
CI COM

Double bond geometry as shown.



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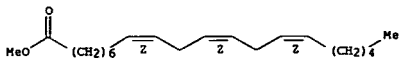
L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 8,11,14-Eicosatrienoic acid, methyl ester, (8Z,11Z,14Z)- (9CI)
MF C21 H36 O2

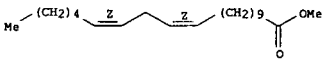
Double bond geometry as shown.



**PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT**

L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 11,14-Eicosadienoic acid, methyl ester, (11Z,14Z)- (9CI)
MF C21 H38 O2

Double bond geometry as shown.



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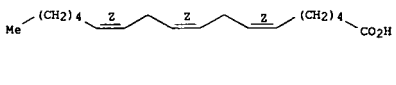
L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, sodium salt, (Z,Z,Z)- (9CI)
MF C18 H30 O2 . Na

Double bond geometry as shown.



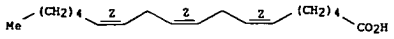
L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, (Z,Z,Z)-, mixt. with sulfur (9CI)
MF C18 H30 O2 . S
CI MXS

CM 1

S

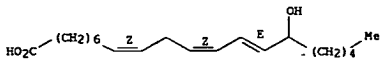
CM 2

Double bond geometry as shown.



L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 8,11,13-Eicosatrienoic acid, 15-hydroxy-, (8Z,11Z,13E)- (9CI)
MF C20 H34 O3

Double bond geometry as shown.



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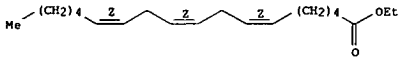
L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, ethyl ester, (6Z,9Z,12Z)- (9CI)
MF C20 H34 O2
CI COM

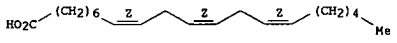
Double bond geometry as shown.



**PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT**

L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 8,11,14-Eicosatrienoic acid, sodium salt, (Z,Z,Z)- (9CI)
MF C20 H34 O2 . Na

Double bond geometry as shown.

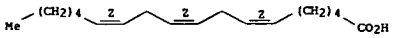


● Na

L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN Vincaleukoblastine, 22-oxo-, mixt. with (Z,Z,Z)-6,9,12-octadecatrienoic acid (9CI)
MF C46 H56 N4 O10 . C18 H30 O2
CI MXS

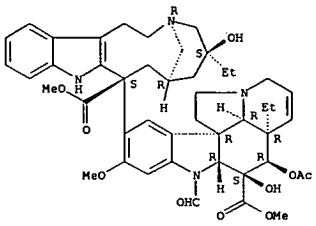
CM 1

Double bond geometry as shown.



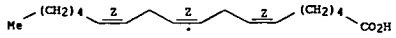
CM 2

Absolute stereochemistry.



L1 14 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 6,9,12-Octadecatrienoic acid, (6Z,9Z,12Z)- (9CI)
MF C18 H30 O2
CI COM

Double bond geometry as shown.



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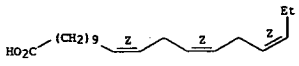
=> d scan l2

L2 5 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 11,14,17-Eicosatrienoic acid, (11Z,14Z,17Z)- (9CI)
MF C20 H34 O2
CI COM

Double bond geometry as shown.



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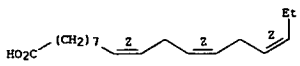
HOW MANY MORE ANSWERS DO YOU WISH TO SCAN? (1):4 •

L2 5 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 9,12,15-Octadecatrienoic acid, sodium salt, (9Z,12Z,15Z)- (9CI)
MF C18 H30 O2 . Na

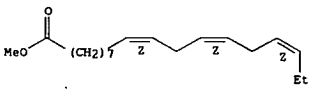
Double bond geometry as shown.



● Na

L2 5 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 9,12,15-Octadecatrienoic acid, methyl ester, (9Z,12Z,15Z)- (9CI)
MF C19 H32 O2
CI COM

Double bond geometry as shown.



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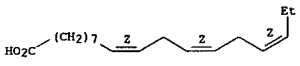
L2 5 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 9,12,15-Octadecatrienoic acid, zinc salt, (Z,Z,Z)- (9CI)
MF C18 H30 O2 . 1/2 Zn

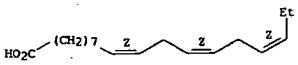
Double bond geometry as shown.



●1/2 Zn

L2 5 ANSWERS REGISTRY COPYRIGHT 2002 ACS
IN 9,12,15-Octadecatrienoic acid, (9Z,12Z,15Z)- (9CI)
MF C18 H30 O2
CI COM

Double bond geometry as shown.

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ALL ANSWERS HAVE BEEN SCANNED

=> log y

| COST IN U.S. DOLLARS | SINCE FILE ENTRY | TOTAL SESSION |
|---|---|---|
| FULL ESTIMATED COST | 24.38 | 24.59 |

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